

APPLICATION UNDER UNITED STATES PATENT LAWS

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Invention: Machine Knife For Trimming Books Or The Like

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This is a:

- ☐ Provisional Application
- ☐ Regular Utility Application
- ☐ Continuing Application
☐ The contents of the parent are
incorporated by reference
- ☒ PCT National Phase Application
- ☐ Design Application
- ☐ Reissue Application
- ☐ Plant Application

SPECIFICATION

Machine Knife for Trimming Books or the Like

The invention relates to a machine knife for trimming books
5 or the like in accordance with the preamble of claim 1.

Machine knives of this type have been known for some time.
It is known in particular to solder blades or cutters made of
hardened steel or a hard alloy to a metallic knife support and to
connect both parts fixedly, i.e. non-releasably, with each other
10 in this way. Such knives are primarily used in so-called three-
knife automatic cutters and flat-cutting machines in the printing
trade.

Such knives can be used several times, because they can be
reground repeatedly. In the process they become shortened and
15 must be freshly balanced each time. Special demands in regard to
quality, accuracy, etc. must be made on the regrinding and
balancing, so that thereafter the process parameters, which are
important for achieving the desired quality and efficiency, remain
assured.

20 As a rule, the work required on the knives is not performed
by the manufacturer, but in local service shops, which proceed in
accordance with their own processing methods. Therefore losses of
quality inevitably occur because of this. Process interruptions
can arise in the worst cases. Moreover, regrinding remains
25 limited to defined metallic materials of defined metallurgical or
chemical composition. This is where the invention comes into play.

It is the object of the invention to propose a novel
machine knife, whose production is cost-effective, which is simple
to use and assures high process dependability.

30 This object is attained by means of the characteristics of
claim 1. Useful further developments are recited in the
subsequent dependent claims.

As will be noted, the machine knife in accordance with the
invention is essentially comprised of two elements, namely a knife
35 support and a blade holder with the blade or cutter, which can be
attached to it and released from it again. The blade or cutter is

permanently connected with the blade holder.

Now the knife support is no longer subjected to wear and is a permanent component of the respective machine. If required, a special cutout or the like is used for the interlocking reception
5 of the fresh wear element, namely the said blade holder and the blade connected therewith.

Basically the blade is made of highly wear-resistant materials, such as special metallic materials. The invention also permits and encourages the employment of other materials, in
10 particular ceramics. In the simplest case the material can be used without a coating, permit great operational dependability and a long service life, wherein the efficiency of the machines can be optimally employed.

Thus, wear is now reduced to that of the blade holder and
15 the blade. In this respect this is a wear element which can be produced comparatively cheaply and where regrinding is no longer worthwhile. It can be replaced simply and with exact fit. With this, the disadvantages mentioned at the outset are no longer present, in particular uncertainties in processing.

20 Further details and advantages will be described in what follows in connection with the drawings. Shown therein are in:

Fig. 1, a machine knife in accordance with the invention in a view from above,

25 Fig. 2, the subject of Fig. 1 in a lateral view, partially in section,

Fig. 3, the detail A in Fig. 2 in an enlarged representation with a special blade arrangement,

Fig. 4, a further machine knife in accordance with the invention in a view from above,

30 Fig. 5, the subject of Fig. 4 in a lateral view, partially in section,

Fig. 6, the detail B in Fig. 5 in an enlarged representation with another blade arrangement,

35 Fig. 7, represents the blade in an enlarged view prior to its connection with the blade holder,

Fig. 8, a machine knife in accordance with the invention in an enlarged representation similar to the representation in Figs. 3 and 6, and

Fig. 9, still another machine knife in accordance with the invention in the above mentioned representation.

In accordance with Figs. 1 to 3, a strip-shaped or, in a view from above, rectangular knife support 1 made of metal is provided with several bores 2 in order to be able to fix it in place, i.e. attach it to a machine, not shown in detail here. On its longitudinal side which, in the mounted state, is free, the knife support 1 has a seam-shaped cutout 3, in which a strip-shaped blade holder 4 of trapezoidal cross section can be embedded in a flat and flush manner and can be secured on the knife support 1 by means of screws, which are not represented here for reasons of improved clarity. But a threaded bore 5 in the knife support 1 and a pass-through bore 6 in the blade holder 4, which is cylindrically widened at the inlet so that a screw can be embedded in a flat and flush manner in the blade holder 4, are visible. As can be furthermore seen from the drawings, the boundary faces of the cutout 3 at the end located at the inside, as well as the boundary faces of the blade holder 4 cooperating with them, extend at an acute angle, i.e. an angle of less than 90°, in respect to each other. A strong interlocked connection is made possible by means of this in the interest of an even and assured transfer of force, as well as a long tool life (service life). A forced seating, so to speak, is provided, into which the blade holder 4 is pressed by force and in which it is then particularly dependably held.

The blade holder 4 is made of metal. Its free end, i.e. its free longitudinal side, is occupied by a blade 7 made of a particularly wear-resistant material. This is a hard alloy with a diamond coating, i.e. with a covering of diamond chips. The blade 7 itself has been embedded in a lock seam 8 on the blade holder 4 and glued to it so it cannot be removed. What was said about the blade holder 4 in respect to the knife support 1 with its seam-

shaped cutout 3 similarly applies to the blade 7 in respect to the blade holder 4 with its lock seam 8. With the blade, too, boundary faces extending at an acute angle in respect to each other provide a good support and secure holding in the lock seam 8 with its corresponding boundary faces wherein, as already stated, the blade holder 4 and the blade 7 are connected so they cannot be separated and constitute a quasi one-piece wear element. This can be produced cost-effectively, can be comfortably manipulated, and in particular can be simply and accurately positioned, and moreover is dependable to use.

The same considerations basically also apply to another embodiment in accordance with Figs. 4 to 7. Here, the knife support 1' has a slightly different shape in a view from above, but otherwise is again designed to be strip-shaped. However, a noticeable difference lies in that the blade holder 4' has a groove 9 on its free end, which extends slightly inclined in respect to the surface of the blade holder 4'. A blade 10 has been embedded in this groove 9. Because of the special support and protection which the groove 9 provides for the blade 10 it is possible here to use a material for the blade 10 which otherwise would not be used because of its sensitivity to shocks. Thus, a blade 10 made of a ceramic material has been chosen, which provides a great cutting quality. With this embodiment the fact that the blade 10 and the blade holder 4' are connected so they cannot be separated and therefore constitute a one-piece wear element also applies.

In connection with a further embodiment of a machine knife in accordance with Fig. 8 it is provided that the blade holder 4" is recessed at the blade tip in relation to the knife support 1" and is shaped in such a way that the blade 11 covers the blade holder 4" over its entire height and forms a contact face 13, which is used for support in respect to the cutout 3. In this case the blade 11 is held even more securely than before, so that it can also withstand greater stress. This is important when forces act on the blade tip not only in the direction of the solid

arrow line P, but also in the direction of the dashed arrow line.
In that case such forces can be partially diverted to the knife support 1" via the mentioned contact face 13 and can be neutralized, so to speak.

- 5 This effect can yet be increased in that an extension section 14 is provided on the blade 12 in accordance with Fig. 9.
This can be stepped in respect to the blade holder 4", but can also have another shape.

ms DB 7

List of Reference Numerals

1	Knife support
1'	Knife support
1"	Knife support
1'''	Knife support
2	Bore
3	Cutout
4	Blade holder
4'	Blade holder
4"	Blade holder
4'''	Blade holder
5	Threaded bore
6	Pass-through bore
7	Blade
8	Lock seam
9	Groove
10	Blade
11	Blade
12	Blade
13	Contact face
14	Extension section
P	Arrow (line)